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ABSTRACT

A study explored the reliability of methods for analyzing the thematic organization of texts. Five linguists, two of whom were native speakers of Swedish and three of whom were native speakers of Finnish, analyzed the thematic organization of a Swedish popular scientific article, using an analysis that focused on coherence reflected in the thematic progression of the text. The analysis was derived from the experimenter's model of thematic relations. The five subjects' interpretations concerning relations expressed in the utterances were compared for extent of agreement. Results suggest that, while the sample of subjects and the quantity of text used were very limited, the categories of textual relations used for analysis are sufficiently clear to make the kinds of judgments required here. Contains 19 references. (MSE)

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SOME CONSIDERATIONS OF INTERSUBJECTIVITY IN THE ANALYSIS OF TEXTUAL RELATIONS

Merja Koskela

1. Introduction

Thematic organisation and textual coherence are perhaps the two most frequently used approaches to text analysis. These approaches are closely interrelated and they both depend on a subjective, knowledge-based interpretation on the part of the reader during the reading. It has therefore proved difficult to find objective and intersubjectively verifiable models for this kind of analysis. Most analyses of these aspects are necessarily intuitive and, at best, examples of the text are cited to justify the researcher's findings.

The interrelationship between thematic organisation and coherence is based on the idea that the utterances which constitute a text must necessarily have some connection with each other, explicitly on the surface level (cohesion) and/or more implicitly on the conceptual level (coherence)[1], if the text is to fulfil its particular communicative goal. In other words, for us to understand a text, it has to be coherent on some level, otherwise it will not be communicatively adequate. In this way, the need to create coherence determines many structural and functional choices in communicative language use. A result of one of these choices is the thematic organisation of texts.

In a study where I compare Swedish scientific and popular scientific texts, I use a method which combines thematic organisation with an analysis of semantic and pragmatic textual relations. The relations analysed are partly surface phenomena and partly conceptual ones. Both types of textual relations are equally important for a reader trying to interpret the thematic organisation of the text.

The method is originally based on the types of thematic progression

[1] *Cohesion* in a text is created by explicit textual relations on text surface, whereas *coherence* includes the more implicit textual relations as related to the background knowledge, beliefs and assumptions of the reader (cf. de Beaugrande & Dressler, 1983; Lundquist, 1989: 123). However, even the surface form of a text can be seen as contributing to coherence in the text (see e.g. Hasan, 1984).

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presented by Danes (1974), but it is supplemented with a systematic categorisation of the textual relations that lie behind each type of thematic progression (for a similar approach see Scinto, 1983). As such, the method is just as intuitive as any other method concerning the thematic organisation of texts, and it is therefore useful to consider how subjective or intersubjective the results gained with this kind of a method can be.

Intercoder reliability is often discussed in linguistic research (Tirkkonen-Condit & Liefländer-Koistinen, 1989: 176; Mauranen, 1993: 49; Laurén, 1993: 158f), but it is seldom explicitly tested. However, the lack of a strict objective method of analysis should invite researchers to explore just how subjective their results are bound to be. For this purpose I have conducted a pilot study, where on the basis of a relatively restricted categorisation of textual relations, four test subjects besides myself analysed intersentential relations relevant to the thematic structure of texts. The aim of the study was twofold: first, to evaluate how intersubjective the results of this kind of analysis are, and second, to find out whether the categories used are clear enough to function as a basis of analysis.

2. The method of analysis

The method of analysis used in my study is based on the idea that the thematic organisation of texts is governed by the notion of coherence. However, as far as I know, these approaches have not been systematically related to each other before. The only explicit attempt in this direction which I have come across is that of Scinto (1983: 84f; see also Lundquist, 1989), even though there has been a repeated demand for such an approach (see e.g. Gülich & Raible, 1977; Hoffmann, 1989: 222). Other attempts in this direction have been made by e.g. Gerzymisch-Arbogast (1987) and Makovec-Cerne (1992), but with little discussion of the explanatory power of such an approach.

Most of the work done on relating thematic organisation to the notion of coherence is based on Danes' model of thematic organisation of texts (1974). He proposes that the thematic organisation of texts be described by means of *types of thematic progression*. The method was originally concerned with sentences, but was later also successfully applied to longer stretches of text, indeed because the types of thematic progression are ultimately based on coherence. Danes (1974: 114) defines the concept of *thematic progression* as

"...the choice and ordering of utterance themes, their mutual concatenation and hierarchy, as well as their relationship to the hyperthemes of the superior text units (such as the paragraph, chapter,...), to the whole text and to the situation."

This definition does not, at least in my opinion, limit the principle of thematic organisation to single utterances, or to the relationships between successive clauses, although many analysts, often for reasons of convenience, have wanted to interpret it in this way.

According to the above definition, the types of thematic progression are based on the idea of textual relations in much the same way as cohesion, and partly even coherence, are often described.

However, all processes creating cohesion and coherence in texts are not relevant to the types of thematic progression. Rather, the idea is based on the following relations:

1. relations between the abstract notion of textual theme and its realisations, the concrete thematic elements;
2. relations between thematic elements, which occur in successive or fairly close sentences, and relations between theme-rheme-nexuses and themes;
3. relations between rhemes and themes (when a rheme recurs as the theme of a sentence later on in the text).

The overall coherence of a text is, however, the result of a complex network of different factors that work towards the same goal: for the text to fulfil its communicative purpose. The processes that underlie the thematic organisation and thus create coherence make it, for their part, possible for the reader to experience the text as a connected whole. As mentioned before, these processes include both cohesion level and coherence level phenomena. However, the line between cohesion and coherence is not always easy to draw.

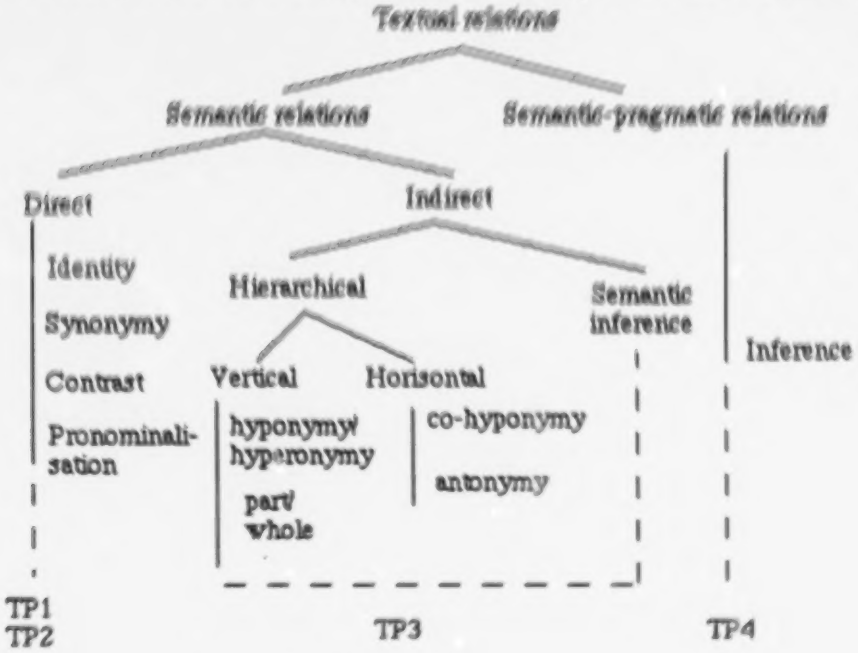
Looking at thematic progression at sentence level gives a picture of the local linear structuring of the text. This kind of analysis can be used to account for some characteristic features of different kinds of texts, e.g. texts representing different genres, but it does not describe the global thematic structure of whole texts.

If we want to get a more comprehensive idea of the thematic structure of whole texts we have to analyse larger entities than single sentences or utterances. Both the *cohesion* and the *coherence* levels of description of thematic organisation have to be accounted for.

In order to achieve this I have created a preliminary categorisation of textual relations and their connections with types of thematic progression, in a manner similar to that proposed by Scinto (1983).

The categorisation is based on the work done by Gerzymisch-Arbogast (1987) and Makovec-Cerne (1992), as well as on my own experiments based on Swedish scientific and popular scientific texts. It should be noted, however, that the categories I propose are not necessarily exhaustive or even mutually exclusive. Such a claim cannot be made until a fully adequate theory of textual relations for intrasentential linkage exists.

Figure 1. Textual relations categorised according to thematic patterning.



TP1 (simple linear thematic progression) and TP2 (thematic progression with a continuous theme) represent the traditional sentence-level approach, the *cohesion*-level of analysis, adopted by many scholars (see e.g. Wiegand, 1988; Francis, 1989; Dubois, 1987; Mauranen, 1993). The textual relations that lie behind these types of progression are direct semantic relations. The most usual ones are listed in the figure (*identity*, *synonymy*, *contrast*, *pronominalisation*).

It should also be noted that these relations need not connect adjacent sentences in order to be relevant. A span of 4-5 sentences or even longer is possible. Givón (1983: 13) for example considers 20 clauses the limit of referential distance.

TP3 represents my understanding of what is commonly known as hypertheme-progression. This type is based on indirect semantic relations

(the *coherence* level), for example *hyponymy/hyperonymy*, *part/whole*, *co-hyponymy* and *antonymy*, or on *semantic inference*.

TP 4 is my addition to Danes' types and it accounts for the themes that lie outside the immediate scope of the text. This kind of thematic development, here termed semantic-pragmatic relations, includes e.g. references to time or place, or to the writer, as well as some grammatical constructions that are often thematised (for example the Swedish pronoun *man*) (*inference of a semantic-pragmatic type*).

As the above description of the method shows, there is no doubt room for intuitive judgement in the analysis. Therefore, the suitability of the categories used and the intersubjectivity of the results have been tested in the pilot study I will describe below.

The method even makes it possible to relegate the thematic elements to different categories of thematic progression on the basis of the textual relations. However, in this pilot study I will only concentrate on discussing the intersubjectivity of the judgements concerning textual relations because the material used is not large enough for an analysis of types of thematic progression.

Usually tests of intersubjective agreement reflect intraobserver inconsistencies and interobserver differences, but even differences in interpreting the instructions may have considerable impact on the results. Hence, I do not claim that an intersubjectivity comparison of a small number of testees necessarily yields valid results. As Mauranen (1993: 49) puts it: "individual bias is not radically different from the bias of two or three individuals in text interpretation."

However, the test is of interest as a linguistic experiment because linguistic methods are far too seldom tested in this way. Additionally, a careful interpretation of the results of the test should give at least some guidance as to how suitable the categories established to describe the textual relations relevant to thematic organisation are, and how reliable the results of an analysis of this type can be.

3. The choice of test subjects

The test subjects were four linguists, all female, as well as myself. Two of the linguists are native speakers of Swedish, and two besides me have completed university studies in Swedish (mother tongue Finnish). The main reason for using expert subjects for the test was that teaching linguistic categories to "naive subjects" would have taken too much time and included too many uncontrollable factors. Using naive subjects would require some other kind of experiment design, for example a

questionnaire, but it is often difficult to say whether such tests really measure what they set out to measure.

To make sure that the group tested was not too homogeneous, I chose people with different linguistic interests. Their areas of specialisation vary from text linguistics to languages for specific purposes, literature and teaching second language courses.

4. Material for the study

As material for the study an extract from a Swedish popular scientific article (*Staffan Bergwall: Den svåra konsten att avbilda atomer*) was used. The particular extract was chosen because it forms an independent whole with its own subheading. On the basis of a preliminary analysis the extract seemed to be sufficiently representative of different kinds of textual relations. And what is more, the extract is of optimal length. This kind of analysis must be concerned with an extract that is short enough to allow full concentration throughout the text, but long enough to offer examples of different kinds of textual relations. In conformity with this, the extract chosen for the experiment consisted of utterances 22-45 in the article, alltogether 24 utterances (see Appendix 2).

The test subjects were given half an hour to complete the analysis, but two of the subjects slightly exceeded the time limit. This indicates that the length of the text extract was suitable.

5. Experiment design

The experiment began with instructions given to the test subjects in their mother tongue (two times in Swedish, two times in Finnish) individually because the tests were carried out at different times during the same week.

First I explained to the subjects what the goals of my research were and how the test was related to those goals. Then we discussed the categories of textual relations used in the analysis in detail. The testees were given one sheet where the categories were presented, and a separate sheet with definitions and examples of typical cases (see Appendix 1). The instruction part included reading both papers together with the test subjects. The subjects were also allowed to use the sheets as an aid during the test. A specimen analysis where the test subject's participation increased as the analysis proceeded was carried out with each subject

before the test.

At the beginning of the test, the test subjects were presented with the whole article from which the test material was an extract. After reading through the article, the subjects were given a preanalysed version of the text where the thematic elements were marked. The test subjects were then asked to follow the instructions, that is, to find and name the textual relations relevant to thematic organisation. The test subjects were also asked to name the origin of the reference (the thematic or rhematic element in question).

The answers were written on a separate sheet. The interpretation of the results is based on these sheets.

6. Results

Because of the small number of testees and the small text corpus, statistical tests would not yield any useful results. Therefore I will use *percent agreement* to report the consistency of the results even though this is a less informative measure than a genuine statistically based reliability measure would be (see e.g. Passonneau & Litman, 1993). Consequently, the results of this pilot study must be seen as indications, not as proven facts.

Total agreement	12	50%
Almost total agreement (4/5)	8	33,3%
No agreement	4	16,7%
Σ	24	100 %

Table 1. Agreement concerning utterances

Table 1 describes the consistency of the subjects' estimates of textual relations. The table shows that there was total agreement in 50% of the 24 cases and almost total agreement (when 4 out of 5 test subjects made the same decision) in 33,3% of the cases. Together these figures indicate that the overall agreement was good: in 83,3% of the cases there was either total or almost total agreement between the subjects' judgements on textual relations. This figure can be considered high because of the general subjective nature of this kind of judgement.

Källgren (1979: 80) has stated that 'stronger' textual relations, for example *identity*, are easier to agree on than weaker ones, for example

inference. Consequently, we could assume that the subjects would most often agree on categories *identity*, *synonymy*, *contrast* and *pronominalisation*, and more seldom on the other categories, except the *semantic-pragmatic type of inference*, which was quite clearly defined in the instructions (see Appendix 1). The results of the pilot study support these assumptions:

Type of relation	Total agreement	Almost total agreement
Identity	6	4
Contrast	2	1
Pronominalisation	0	1
Semantic inference	0	2
Sem-pragm. inference	4	0
Total	12	8

Table 2. Total agreement and almost total agreement according to the type of textual relation.

Identity and the second type of *inference* (semantic-pragmatic) seem to be the strongest textual relations among the categories. When we look at the 20 cases where there is either total or almost total agreement, *identity* comes out as the category with the highest degree of agreement: there is total agreement 6 times out of 12 and almost total agreement 4 times out of 8. On *inference* of the semantic-pragmatic type there is total agreement in 4 cases out of 12.

Considerable disagreement among the test subjects was found in 4 utterances out of a total of 24 (that is 16,7%). A closer look at these cases reveals that there are several textual relations involved. For example for the beginning of the text extract (utterance 22), three different categories of textual relations were suggested, even though the instructions explicitly stated that the beginning of a chapter is usually categorised as *semantic inference* from the textual theme. Consequently, the differences here can be counted as misinterpretations of the instructions.

The other cases of disagreement are more interesting. In spite of the fact that the textual relations in question do not seem to be difficult for the reader to understand, different categories were proposed. Utterance 25 (below) serves as an example of how difficult it is to create mutually exclusive categories for textual relations (thematic elements printed in

boldface):

24. och **upphovsmännen Gerd Binning och Heinrich Rohrer från IBMs laboratorium i Schweiz** fick halva Nobelpriset i fysik år 1986 för sin insats.

25. (**Andra halvan** gick till uppfinnaren av elektronmikroskopet.)

The rheme in utterance 24 states that two scholars got half the Nobel prize for their invention in 1986, and the theme in utterance 25 explains that the other half of the prize went to the inventor of the electron microscope.

This relation was described as *identity*, *contrast* (by two subjects), *part/whole* relationship and as *co-hyponymy*. Obviously, on some level all the subjects are right in their judgements, even though *identity* in this case is perhaps a somewhat unusual interpretation and *part/whole relationship* has probably been chosen because of the semantic content of the elements involved in the relation (*half, the other half*).

The rest of the disagreements (utterances 32 and 41; see Appendix 2) were, as could be expected, between the two types of inference: *semantic* and *semantic-pragmatic inference*. It is sometimes difficult to decide whether a thematic element should be considered something closely related to the textual theme, in this case *a microscope* (semantic inference) or as something from outside the scope of the text (semantic-pragmatic inference). This kind of confusion was, for example, caused by utterance 41 (below), which introduces *a computer* (*en dator*) in the description of the method of how the microscope functions:

40. **Information om denna variation** når nålspetsen som hela tiden "flyter" på ett och samma avstånd ovanför ytans struktur.

41. **En dator** ritar sedan upp en bild av den undersökta ytan (bild 1).

If we want to get an idea of how individual test subjects agreed with each other, we will have to describe the results in relation to majority judgements. In studies where no judgements can be considered to be right or wrong, this is one way to compare the individual subjects' results. However, as the example just discussed shows, majority judgements in this study should not be taken as true values.

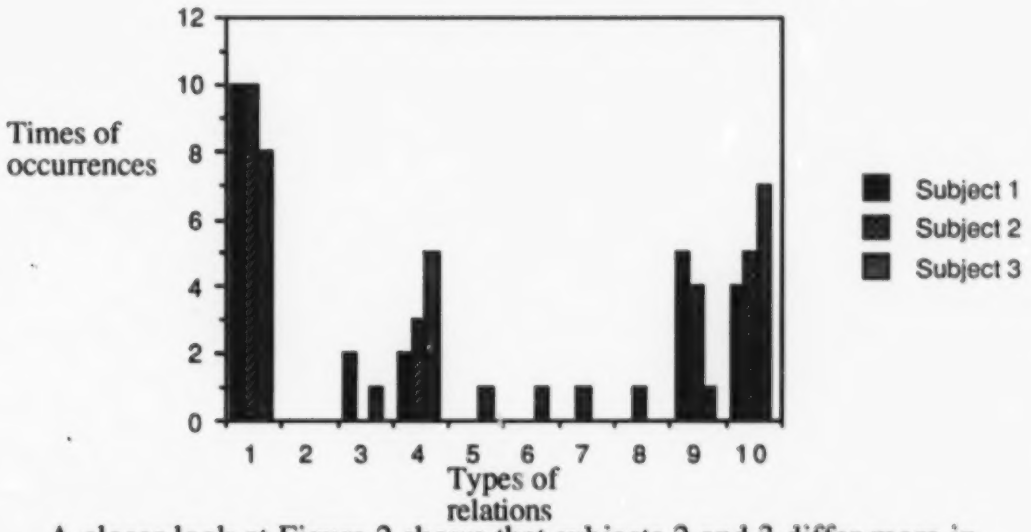
Table 3 describes the test subjects' agreement with the majority opinion, which in this case means that 3 subjects out of 5 agree on a given judgement. The percent agreement is the ratio of observed agreements with the majority opinion to possible agreements (n=24).

Subject	Agreement (3/5)	%	(n=24)
1	21	88%	
2	18	75%	
3	18	75%	
4	20	83%	
5	21	88%	
Mean	19,6	81,7%	

Table 3. Agreement with the Majority Opinion.

The table shows that all the subjects agree in at least 18 cases with the majority opinion. Subjects 1 and 5 have the highest agreement figures, whereas subjects 2 and 3 have the lowest values. Figure 2 below illustrates how the judgements made by subjects 2 and 3 relate to those made by subject 1.

Figure 2. The use of different categories by test subjects 1, 2 and 3.



A closer look at Figure 2 shows that subjects 2 and 3 differ more in their use of the scale than the rest of the subjects do. Subject 1, for example, identifies five different categories whereas subject 2 identifies six and subject 3 seven. The small corpus, of course, prevents any definite evaluations, but it is interesting to note that subjects 2 and 3 do

not seem to agree with respect to their use of additional categories. Subject 2 prefers horisontal hierarchical relations (categories 7 and 8 in the figure), whereas subject 3 prefers vertical hierarchical relations (categories 5 and 6).

Obviously, the causes of differences of judgement can be many. Besides differences in knowledge of the world, one possible factor is differences in reading strategies. The analysis required by my instructions is mainly a surface level analysis where deeper semantic implications are not taken into consideration. What Lundquist (1989: 134) calls *coherence-for-an-expert* is therefore outside the scope of the analysis. In other words, the analysis covers the *cohesion* level of textual relations and that part of the *coherence* level which does not require advanced expert knowledge. The reason for this is the need to gain similar results for both scientific and popular scientific writing. Because a layman cannot have sufficient knowledge of the different implicit lexical relations used in scientific writing, a surface level analysis is the only possibility, even though a deeper analysis of semantic relations is possible in popular scientific writing (cf. Myers, 1991). However, if the test subject's normal reading strategy includes deep semantic analysis of the contents of the text and the relations within it, it is likely that this will show in the analysis as a wider range of categories. One additional factor that supports this interpretation is that subjects 2 and 3, who used more categories, are both native speakers of Swedish. This could lead to the assumption that a surface level analysis may be easier to conduct for a non-native speaker, at least when it is a question of popular scientific texts. However, the results only concern two test subjects and are therefore not reliable enough for this kind of conclusion.

The relatively high degree of agreement between the test subjects allows us to assume that the method of analysis would guarantee at least some degree of reliability even for types of thematic progression. In fact, the degree of agreement regarding types of thematic progression should be even higher. For example, it does not matter whether a relationship is judged as *identity* or *pronominalisation* because both are categorised either as TP1 or TP2 depending on the origin of the reference.

7. Conclusion

In summary, it must be stated that both the number of test subjects and the number of cases in the pilot study are too small for any definite conclusions. Still, the results of the study indicate that the categories used

are sufficiently clear to serve as a basis for judgements on textual relations, even though there will always be difficulties in making the categories mutually exclusive.

The results concerning the intersubjectivity of the judgements in this study reflect interobserver differences. These can be caused by many factors, e.g. personal differences, the different subjects' varying knowledge of the world or different reading strategies, but they can also reflect different interpretations of the instructions. All these are uncontrollable factors in any test. Anyway, the result, total or almost total agreement in 20 (83,3%) out of 24 cases, seems to encourage further investigation with the method.

However, the intuitive aspect can never be totally removed from the analysis of coherence or from the analysis of thematic organisation. Both methods call for a qualitative individual analysis where the criteria used are made explicit. The agreement or disagreement between two or three people does not radically change the picture.

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